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Studying the acceptance of somatosensory game for Chinese square dancers

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Abstract

This study investigated the acceptance of square dancers on a somatosensory game. Typical "Square dance" activity has a large number of middle-aged and older people dancing together accompanied by traditional songs in the park in China. Square Dance affords a way to relax and enjoy themselves for retired residents. But there is some negative effect of the square dance such as nuisance and environmental issues. We envisage that indoor Somatosensory Games not only can satisfy people's needs on entertainment and sports but also reduce the negative effect in public. Nine Chinese square dancers were invited to experience the somatosensory game, and the average time of experience is 43.67 minutes. Afterward each Chinese square dancer accepted an interview about their acceptance of the somatosensory game related to square dancing. The results showed that most reason for the elderly enjoying square dance because it can maintain body fitness. And the most important limitation of the square dance is air quality. Chinese square dancers also convey some suggestions for the somatosensory game on the market such as the game interface must be simple and easy to understand. This study is helpful for developing somatosensory games for the elderly in China.

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1. Introduction

Along with the rapid growth of the Chinese national economy, people consider how to use leisure time to improve the quality of life. After the 2008 Olympic games, the government promoted an increase in health in general for people. Chinese people utilize a version of dance outside that does not spend money and satisfies older people's need to have movement. The square dance grew in popularity in China around 2008, and it has already sparked the interest of more than fifteen million people. The square dance is becoming well known amongst the people of China, which draws large crowds, thereby producing noise nuisance and environmental problems. Previous research found that somatosensory games were useful in rehabilitation, such as stroke, Parkinson's disease and orthopedic rehabilitation therapy. Therefore, studying the application of somatosensory games in the field of the square dance is a new research direction.

1.1. The older generations

China is the only country that has more than 100 million elderly. The health of the elderly progressively decreases. In order to ensure stronger health and improve quality of life effectively, it is necessary to introduce effective physical exercise. ^[1] The study on the elderly fitness sports is an increasing concern by society.

Some reasonable physical exercise like low intensity aerobic exercise, Tai Chi and healthy Yangge (a type of Chinese traditional dance) have become safe and healthy rehabilitation measures for older people. And dance training has an obvious effect on promoting the physical and mental health of the elderly. Wan ^[2] said elderly dance helps to lower blood pressure, improve pulmonary function and decrease bone loss. Aerobic exercise can reduce the resting heart rate and blood pressure, improve the step test index, and increase lung capacity. It is an effective method to improve the fitness function of the heart and lungs of middle-aged women. ^[3] The Xu's research shows that dance can improve the physical health of the elderly and it should be vigorously promoted. ^[4]

1.2. Chinese square dance

Chinese people's health consciousness is more and more intense because of the social progress and development. Fitness, leisure and entertainment have gradually become the people's daily needs. And square dancing with its dynamic music, rich and diverse content are the reasons why Chinese middle-aged women enjoy the square dance. There are three aspects to explain the popularity of the square dance.

- **Diversity:** The choices of music and dance types are very diversified and influenced by the level of professionalism, the team innovation, traditional culture and popular music trend. The costumes, props and facial expressions can adjust in accordance with the music and dance. [5]
- **The Masses:** An important difference between the square dance and stage dance, for example, is that the latter's actors are on the stage and are isolated from the masses. However, square dance performers are with the crowd and the audience and everyone is joining in. [6]
- **Fitness:** There are some advantages for the elderly joining square dance exercise in China, such as enhance their physique, adjust state of mind, enrich their retirement and reduce depression anxiety. [7] Long-term square dance can improve the depth and intensity of the quiet breathing. Dancing is also improves the physiological function, maintaining the oxygen and carbon dioxide in the blood and tissues of balance. [8]

1.3. Negative news and the future of square dance

The China's public sports space is limited, insufficiently meeting the current demand of the elderly. Square dancers have no choice but to gather in a small street or a community park. Some negative issues have raised, for example the venue issue and noise pollution. In October 2013, the music of square dance was so loud, bothering the neighbours in Beijing. The man took out a double barrel shotgun and shot bullets into the air. ^[9] Not only in China, some Chinese dancing grannies raised a ruckus at Sunset Park in Brooklyn, angering locals and prompting police arrest in August 2013. ^[10]

1.4. Somatosensory game

Somatosensory games breaks through the operation of input by handle, instead using body language or gestures to control the video game. Somatosensory interaction is a kind of interaction in which users can use their body language directly to interact with the environment instead of complex controllers or some device. Somatosensory means change through physical action. The abroad platforms include Wii, Xbox360, Leap Motion, etc.

1.5. Rehabilitation research of somatosensory game

In recent years, the field of somatosensory games has grown immensely. One of the newest fields to benefit from the advances in somatosensory technology is medical rehabilitation. Using somatosensory video games is a viable approach to promote selective attention of institutional-dwelling elderly with disabilities.^[11] Most of the studies on somatosensory is rehabilitation in patients with stroke. The stroke patient is required to execute similar actions persistently and repeatedly, making the somatosensory game suitable for the stroke patient's rehabilitation.^[12] Adequate content, game interfaces, sustainability and appropriate settings are critical factors for the success of SG.^[13]

2. Research question

- What factors affect engagement in outdoor square dance for Chinese women?
Although square dance has strong social function, it is easily influenced by environment relatively. There are some conditions that are not suitable for exercises outdoors, such as cold weather or windy. When these limits occur outside, the indoor somatosensory game is more suitable for the elder population.
- What Factors Affect Women's Somatosensory Game Acceptance?
In recent years the somatosensory game makes some elder groups try to exercise at home. The aim of this study is to explain and predict the acceptance factors on the somatosensory game for women square dancers and to provide a good somatosensory game system to achieve the exercise requirement for them.
- What factors will lead to the continued use of Somatosensory Games at the completion of the experiment?
Many previous studies have shown that somatosensory games can help rehabilitation treatment. And somatosensory game is different from the boring traditional rehabilitation treatment. The factors that will lead the elderly to use somatosensory game continually will be the most important design considerations.

3. Method

3.1. Participants

A total of 9 Chinese women who dance every morning at eight o'clock were recruited as participants. All the participants had at least one-year experience with square dance. The age of the participants ranged from 48 to 58 years old (mean 52.7, SD 3.164). People in this age range meet the definition of older adults and were the major population in older adults who enjoy square dance.

3.2. Materials

The experiment was held in the participant's house that provided a comfortable environment. The main experimental equipment is SUBOR X360 Game Player. A SUBOR X360 Game Player is including one game console, a power supply, AV cable, 8G game cards, two wireless control handle and one dancing blanket. All the contents of interview were record by voice recorder.



Fig. 1. Chinese Square Dance.

3.3. Task

In this experiment, the participants experience the somatosensory game for about 40 minutes. There are two types of games which participants experience, one being hand movements and the other is foot movements. The hand movement games include Bowling, 'Whac-a-mole', and Tennis. And the foot movement games include Dance, Running, and Yoga.

3.4. Procedure

This study decided to use in-depth interviewing as the main method to collect data. The researcher will ask open-ended questions orally and records the participant's answers. The experiment is divided into three parts, interviews about the square dance, and the somatosensory game before and after user experience respectively.

Before starting the experience task, participants chatted on the topic of square dance with the researcher in the field informally. The researcher fostered 'low pressure' interactions and allow respondents to speak more freely and openly. To carry out the task, participants were allowed to experience the somatosensory game without time limitations. During the experiment, the researcher recorded the experience time of each game and every sentence by voice recorder. After the experience task, researcher and participant gather to discuss the somatosensory game.



Fig. 2. The experimental environment.

4. Results

4.1. Benefits of square dance

All of the participants are housewives, and parts of them are the retired factory workers. Each square dancer has a fixed family income. Almost all the participants indicated joining square dance in order to maintain body fitness and showed interest in the habit of daily exercise. The second important factor for square dancer is maintaining community relations. Some participants said if there were no square dance, they would not have communication between neighbors. Since community square dance originated two years ago, the atmosphere of the community gradually became more energetic and vigorous. The square dancers often actively participate in performances around the country, giving each square dancer a goal.

4.2. Limits of square dance

The average amount of time spent by each of the nine study participants in a week joining square dance is 5.2 days (standard deviation: 1.202). For most participants, the serious problem of joining square dance is air quality. Beijing and Tianjin are the two most industrial cities that have serious regional haze. Many participants mentioned that inhaling excessive dust is really uncomfortable when the haze is too severe. And it is really harmful to the body. Furthermore, family is another important influence for square dancers. Sometimes participants need to take care of their family members such as a grandson or pregnant daughter-in-law. Between the square dance and family, participants always choose family.

Some participants mentioned the negative news from television. They refuted those events are just a small percentage of cases. Most of the square dance groups are organized by ten to twenty people. When these small groups dance in the park or the side of the road, the music is not too loud. Because of the news reports, many people have a negative first impression of the square dance.

4.3. Acceptance of the somatosensory game

The average time of all the participants' experience is 43.67 minutes (standard deviation: 5.46). Each participant plays the game content differently. Further experience information about the game and the experience time is counted in Table 1. In terms of the hand movement game, 'Whac-a-mole' is the most popular game for square dancers. Some participants indicated that 'Whac-a-mole' is the only game that can exercise both hands. In terms of foot movement game, participants spent much more time on Dance and Yoga. Most participants thought the Dance game is similar to square dance. During the experience on Dance, they felt a sense of accomplishment when their footsteps match with the music in the right rhythm. Although there are few participants experienced in Yoga, but the time spent by each participant is considerable.

Table 1. The statistics of experience information.

Name of the game	Hand Movements			Foot Movements		
	Bowling	Whac-a-mole	Tennis	Dance	Running	Yoga
The number of participant to play	6	9	3	9	6	4
The average time of experience (minutes)	7.67	13	8	11.45	9	12.25
Standard deviation	1.89	1.69	0.82	2.01	2	3.49

4.4. Participants' advice and feedback on the contact of somatosensory game

Each game has a different design style, benefits and disadvantages. Participants provided a number of suggestions about the somatosensory game after the experience. Many square dancers suggested that the game interface must be simple and easy to understand; no additional decoration, to prevent difficulty reading instructions.

Because most Chinese square dancers have only junior high school education, some participants suggested the game instructions must be clear. There was also suggested a great idea of using the dynamic animation as game instructions. The background music must be familiar and suitable for the elderly, such as folk songs, folklore songs, and campus songs. Some participants suggest that somatosensory game could be classified by ages so that the elderly can find what people want to play quickly and easily.

5. Discussion and conclusions

Because of the rapid development of science and technology, the form of movements for the elderly will gradually become technological. Also somatosensory rehabilitation will also progressively be taken seriously. The results of this study will benefit companies who want to develop the somatosensory game for the elderly. There are four participants, who on their own initiative asked the researcher some information about the somatosensory game; for example the price, the number of games in the console, where they can buy the somatosensory game, etc. Although the Chinese square dancers prefer to exercise outdoors, they have a little interest in the somatosensory game after the experience.

There are some limitations to this study. First, participation was limited to Beijing and Tianjin. Second, the data were collected from a small number of participants. Finally, because of the poor educational background of the Chinese square dancer, they only used a few words to express their opinion of the experience.

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